

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No. : 10/516,463

PCT Filed : JUNE 9, 2003

PCT No. : PCT/JP2003/007265

For : RUBBER COMPOSITION AND TIRES MADE BY USING THE
SAME

Art Unit & Examiner : 1796, Ms. Vickey Ronesi

DECLARATION UNDER 37 CFR 1.132

ASSISTANT COMMISSIONER FOR PATENTS

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Sir:

I, Noriaki YUKIMURA, in care of 3-1-1, Ogawahigashi-cho Kodaira-shi, Tokyo, Japan, declare that;

1. I graduated from The University of Tokyo in doctor's course of Graduate School of Science majoring chemistry in March 2007, and joined BRIDGESTONE CORPORATION in April 2007. Then, I have been engaged in the research and development of compounding ingredients for rubber compositions in Tire-Material-Development Department up to the present.

2. I am familiar with the subject matter disclosed in the application.

3. Experiment

Object of Experiment

In order to clarify differences of various physical properties between "Example 2 of this invention described in the specification" and "Examples 1, 4 and 5 of Scholl et al." and between "Examples 5, 6, 7 and 9 of this invention described in the specification" and "Examples 2, 6 and 7 of Scholl et al.", the following experiments were conducted.

Procedure of the Experiment

The compounding recipes except for the silane compounds having sulfur atom and the production procedures for the above rubber compositions are the same as Example 1 of this invention described in the specification. These experiments were conducted by the equimolar amounts of the silane compounds having sulfur atom.

Test Methods

The evaluation items and the test methods are the same as those described in the specification of this invention.

Result

The results obtained are shown in the following Tables A and B.

Table A

	Example	Comparative Examples		
	2	A'	B'	C'
The basis of Example or Comparative Example	Example 2 of the present invention	Example 1 of Scholl et al.	Example 4 of Scholl et al.	Example 5 of Scholl et al.
Silane compound having sulfur atom	SE2	A	B	C
Molecular weight	679.22	695.27	723.33	751.38
Purity (%)	84.2	84.1	84.1	84.3
Amount (phr)	6.6	6.8	7.0	7.3
Molar amount ratio	9.7	9.8	9.7	9.7
Mooney viscosity (ML1+4)	87	117	112	105
Mooney scorch time	100	73	75	74
Hardness	100	100	105	106
Properties at break				
- Elongation at break (Eb)	106	86	85	84
- Strength at break (Tb)	108	87	87	88
- Tensile stress at 300% elongation	101	118	119	120
Resilience	107	107	109	111
Abrasion resistance	103	85	86	88

Note

SE2: The compound of Synthesis Example 2 of the present invention.

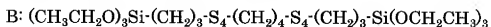
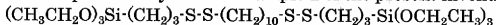
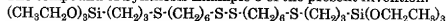


Table B

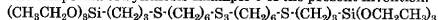
	Examples				Comparative Examples		
	5	6'	7'	9'	D'	E'	F'
The basis of Example or Comparative Example	Example 5 of the present invention	Example 6 of the present invention	Example 7 of the present invention	Example 9 of the present invention	Example 2 of Scholl et al.	Example of 6 Scholl et al.	Example of 7 Scholl et al.
Silane compound having sulfur atom	SE5	SE6	SE8	SE11	D	E	F
Molecular weight	707.28	739.34	819.49	855.57	851.59	963.80	815.45
Purity (%)	85.7	85.9	85.9	85.5	85.4	85.5	85.7
Amount (phr)	7.2	7.5	8.4	8.7	8.7	9.8	8.3
Molar amount ratio	10.2	10.1	10.2	10.2	10.2	10.2	10.2
Mooney viscosity (ML1+4)	104	103	100	103	115	110	122
Mooney scorch time	95	93	95	96	73	70	75
Hardness	104	110	102	103	114	113	109
Properties at break							
· Elongation at break (Eb)	95	87	104	100	77	78	79
· Strength at break (Tb)	98	100	105	101	89	87	84
· Tensile stress at 300% elongation	105	122	103	99	120	120	118
Resilience	112	114	111	111	113	112	110
Abrasion resistance	109	110	110	108	83	85	84

Note

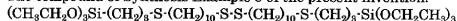
SE5: The compound of Synthesis Example 5 of the present invention.



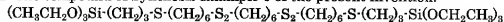
SE6: The compound of Synthesis Example 6 of the present invention.



SE8: The compound of Synthesis Example 8 of the present invention.



SE11: The compound of Synthesis Example 6 of the present invention.

D: $(\text{CH}_3\text{CH}_2\text{O})_3\text{Si}-(\text{CH}_2)_3-\text{S}_4-(\text{CH}_2)_2-\text{S}_4-(\text{CH}_2)_2-\text{S}_4-(\text{CH}_2)_3-\text{Si}(\text{OCH}_2\text{CH}_3)_3$ E: $(\text{CH}_3\text{CH}_2\text{O})_3\text{Si}-(\text{CH}_2)_3-\text{S}_4-(\text{CH}_2)_6-\text{S}_4-(\text{CH}_2)_6-\text{S}_4-(\text{CH}_2)_3-\text{Si}(\text{OCH}_2\text{CH}_3)_3$ F: $(\text{CH}_3\text{CH}_2\text{O})_3\text{Si}-(\text{CH}_2)_3-\text{S}-(\text{CH}_2\text{CHOHCH}_2)-\text{S}_4-(\text{CH}_2\text{CHOHCH}_2)-\text{S}_4-(\text{CH}_2)_3-\text{Si}(\text{OCH}_2\text{CH}_3)_3$

4. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 2009.12.24

By: Noriaki Yukimura
Noriaki YUKIMURA